MACHAKOS UNIVERSITY

University Examinations for 2019/2020 Academic Year

SCHOOL OF BUSINESS AND ECONOMICS

DEPARTMENT OF ECONOMICS

…………… YEAR SECOND SEMESTER EXAMINATION FOR

MASTER OF SCIENCE IN AGRIBUSINESS AND INTERNATIONAL TRADE

AGB 808: AGRICULTURAL ECONOMETRICS

DATE: **TIME:**

INSTRUCTIONS:

    (i)   **Answer question one (Compulsory) and any other two questions**

    (ii)   **Do not write on the question paper**

    (iii)   **Show your workings clearly**

QUESTION ONE (COMPULSORY) (20 MARKS)

a)   Evans a farmer in Machakos County has been supplying tomatoes to Le Technische Hotel for several years now. He has commissioned to analyze the supply behaviour, relating sales to prices and costs of production. He has provided the following information:

Source of Variation	Sum of Squares	Degrees of freedom	Mean Sum of Squares
Due to regression (ESS)	23.08	-	-
Due to residual (RSS)	-		-
Total Variation (TSS)	23.20	4	

    i.   Find the number of years in question   (2 marks)

    ii.   Compute RSS   (3 marks)

    iii.   Find the R^2 and adjusted R^2. Interpret the adjusted R^2 (6 marks)

    iv.   Do prices and production costs jointly affect supply? Test at the 5% level of significance.

         (5 marks)

v.   Differentiate between heteroscedasticity and autocorrelation   (4 marks)

QUESTION TWO (20 MARKS)

a)   A researcher obtained the following regression results

$$Y = 389.6 + 60.8X_1 - 36.5X_2 - 0.061X_3$$

Se   (10.3)   (13.2)   (0.043)

Where Y is maize productivity in Machakos County in bags, X_1 is price of maize per bag, X_2 is cost of production per bag of maize and X_3 is population of Machakos County in thousands.

    i.   Is there multicollinearity in the regression? How do you know?   (3 marks)

    ii.   Explain how in practice the researcher can test for multicollinearity.   (3 marks)

b)   Explain the nature of agricultural data used by researchers.   (6 marks)

c)   Using relevant example, explain the steps to be followed in carrying out an empirical agricultural research.   (8 marks)

QUESTION THREE (20 MARKS)

a)   From the Kenya Integrated Household Budget Survey of 2016 of the Kenya National Bureau of Statistics, Verena obtained the following Probit model based on a sample of 2820 households. The purpose of the pobit model was to determine tractor ownership as a function of (logarithm of) farmer's income. Tractor ownership was a binary variable: $Y = 1$ if a farmer owns a tractor, zero otherwise.

$$Y_i = -3.84 + 0.68 ln farmincome$$

t   (-6.70)   (8.15)

$\chi 2$ (1df) =16.681   (p value) = 0.0000

Where Yi is estimated probit and where lnfarmIncome is the logarithm of farmer's income. The $\chi 2$ measures the goodness of fit of the model.

    (i)   Interpret   the   estimated   probit   model (3marks)

    (ii)   Comment on the statistical significance of the estimated probit model (3marks)

b)   What problem is one likely to face when estimating simultaneous equation system using OLS?   (4 marks)

c)   Explain alternative methods used to overcome the problems discussed in (b) above.(10 marks)

QUESTION FOUR (20 MARKS)

a)   Explain the classical linear regression assumptions   **(**10 marks)

b)   Consider the following regression results

$$Maizeprod = 2.7491 + 1.1507D - 1.5294P - 0.8511D.P$$

t   (26.896)   (3.6288)   (-12.5552)   (-1.9819)

$$R^2 = 0.9128$$

Where $Maizeprod$ = maize production in Trans Nzoia County in '000 bags, P = price of 50 kg bag fertilizer, D= 1 for period when there was fertilizer subsidy, 0 otherwise.

i.   What is your priori expectation about the relationship between maize production and price of fertilizer?   (1 mark)

ii.   Holding price of fertilizer constant, what is the average maize production in the period when there was fertilizer subsidy? Is it statistically different from the period when there was no fertilizer subsidy? How do you know?   (3 marks)

iii.   What could be the implication of not including D.P in the regression model (3 marks)

iv.   Are the slopes in the periods of fertilizer subsidy and no fertilizer subsidy statistically different? How do you know?
        (3 marks)

QUESTION FIVE (20 MARKS)

a)   What are the disadvantages of panel data?   (6 marks)

b)   Is there a difference in fixed effects model FEM and least-squares dummy variable (LSDV) Model?   (4 marks)

c)   Explain how a researcher can choose between fixed effects model (FEM) and random effects model (REM).   (5 marks)

d)   Differentiate between Linear probability model and Logit Model.   (5 marks)